

EDITORIAL COMMENT

Does Hospital Coronary Intervention Volume Matter in Predicting Mortality?*

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In the late 1990s, the Institute of Medicine pointed out that the health care system in the U.S. performs far below obtainable levels of patient safety and overall values. It is estimated that 44,000 to 98,000 Americans die each year as a result of medical errors. In 1998, the Leapfrog Group (1) was formed by a number of large U.S. health care purchasers to initiate breakthroughs in the safety and the overall value of health care to U.S. consumers. One of the three initial methods to improve patient safety is evidence-based hospital referral (2):

“One marker of how well a hospital is likely to perform is the experience of the hospital and its surgical team. In the absence of data to compare hospitals on their complications and survival rates, one can begin evaluating experience by looking at the number of high risk treatments and procedures a hospital performs each year. Referrals to institutions with a lot of experience treating certain conditions offer the best survival odds. For example, Evidence-Based Hospital Referral for certain conditions show strong statistical relationships between patient survival and a hospital’s annual volume of such procedures.”

One such procedure is percutaneous coronary intervention (PCI). Based on the guideline set by the American College of Cardiology/American Heart Association (3), the Leapfrog group has established a minimum institutional volume requirement of 400 cases per year for hospitals offering PCI.

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This volume threshold was set using the data based on studies published in the late 1980s and early 1990s using balloon angioplasty as the primary technology. These studies show that there is an increased mortality risk for patients treated at hospitals with annual PCI volumes of fewer than 400 cases (4). However, with the advent of widespread coronary stenting, the use of IIb/IIIa antagonists and oral adenosine diphosphate antagonists, PCI appears to be

significantly safer for a large range of patients. Whether the old volume criterion is still valid is unclear. In this issue of the *Journal*, Epstein et al. (5) describe a study that evaluated whether the current volume standard still holds in the stent era.

The authors studied the in-hospital mortality among 362,748 patients in the Agency for Healthcare Research and Quality National In-patient Sample hospital discharge database. The hospitals were separated into low- (5 to 199 cases/year), medium- (200 to 399 cases/year), high- (400 to 999 cases/year), and very high- (1,000 cases or more/year) volume centers. Compared with patients treated in high-volume hospitals, patients treated in low-volume hospitals remained at increased risk after adjustment for patient characteristics. However, patients treated at medium-volume hospitals had a similar risk as high-volume centers. Thus, is it time to change the American College of Cardiology/American Heart Association volume criteria?

Not so fast! This study (5) certainly suggests that the 400 cases/year figure may be high in the stent era, but low-volume centers should still be concerned about quality. The unadjusted mortality rate is 1.58, 1.12, 1.00, and 0.84 among the hospitals with increased patient volume. After being adjusted for clinical variables, the difference became smaller, mainly because there is a larger proportion of patients with myocardial infarction and smaller proportions of elective admissions and patients who arrived by inter-hospital transfer in the low-volume centers. However, no account was taken of the angiographic characteristics or lesion complexity. It is common that large and very large centers do indeed perform “high-risk rejects” from other hospitals and that small-volume hospitals may not perform PCI in multivessel disease patients (5). Thus, the adjustment for clinical risks may or may not mask the real difference between the hospitals.

The volume criteria may indeed need to be re-examined, but careful review of patient populations is prudent. This study also has not taken into account whether operator volume affects outcome, especially in the low-volume centers. Thus, both hospital volume data and operator volume probably will be important if the best outcome is to be achieved.

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